

What is claimed is:

1- A ball grid array substrate for semiconductor devices which comprises:

5 a) a dielectric substrate having a first and second major surface with one or more apertures through said substrate,

b) metallization patterned on the first surface of said substrate contacting each of said vias, and including one or more bonding pads for providing  
10 interconnection to said semiconductor device,

c) a core of solderable metal within each of said apertures intimately connected to said patterned metallization, and extending through a minimum of one-third the substrate thickness, and

15 d) a solder ball extending into said via from the second surface, making intimate contact with said solderable metal.

2- A substrate as in claim 1 wherein said core of solderable metal comprises electroplated copper.

20 3- A substrate as in claim 1 wherein said core of solderable metal has a planar surface.

4- A substrate as in claim 1 wherein said core of solderable metal includes thin layers of nickel and gold on the surface contacting said solder ball.

5- A substrate as in claim 1 wherein said dielectric material comprises a flexible film.

6- A substrate as in claim 1 wherein said dielectric material comprises a polyimide polymer.

5 7- A substrate as in claim 1 wherein said dielectric material comprises a composite polymer.

8- A substrate as in claim 1 wherein said dielectric material is in the range of 50 to 175 microns thickness.

10 9- A substrate as in claim 1 wherein said patterned metallization comprises copper.

10- A substrate as in claim 1 wherein said solder balls comprise eutectic tin /lead solder.

15 11- A substrate as in claim 1 wherein said solder balls comprise a lead free solder.

12- A substrate as in claim 1 wherein said vias are in the range of 100 to 300 microns in diameter.

20 13- A substrate as in claim 1 wherein the height to width ratio of said vias is a maximum of 0.3 to 1.0.

14- A via structure for attachment of a solder ball including;

a dielectric base having one or more apertures,

a solid core of solderable metal extending from one surface to a minimum of one third the thickness of said base, and

a height to width aspect ratio of 0.3 to 1.0 or less.

15- A via structure as in claim 1 wherein said solderable metal core is in intimate contact with a patterned metallization on at least one surface of said base.

16- A via structure as in claim 1 wherein said solderable metal core comprises a plated conductor.